Available online at www.sciencedirect.com

ScienceDirect

journal homepage: www.elsevier.com/locate/burns

The effect of aromatherapy massage with lavender and chamomile oil on anxiety and sleep quality of patients with burns

Forough Rafii [a], Farzaneh Ameri [a,*], Hamid Haghani [b], Ali Ghobadi [c]

[a] Department of Medical-Surgical Nursing, School of Nursing and Midwifery, Iran University of Medical Sciences, Tehran, Iran

[b] Department of Biostatics, School of Health, Iran University of Medical Sciences, Tehran, Iran

[c] Department of Traditional Medicine, School of Health, Iran University of Medical Sciences, Tehran, Iran

ARTICLE INFO

Article history:
Accepted 19 February 2019

Keywords:
Aromatherapy massage
Chamomile
Lavender
Anxiety
Sleep quality
Burn

ABSTRACT

Introduction: Regarding the importance of anxiety management and improvement of the quality of sleep in patients with burn injuries, this study aimed to determine the effect of aromatherapy massage (using aromatic oils of lavender and chamomile) on the anxiety and sleep quality of the patients with burn injuries.

Method: In a quasi-experimental study, 105 patients with burns were recruited by convenience sampling method and then assigned into three groups (control, placebo massage, and combined aromatic oil massage). The study intervention was performed 20 min before bedtime in three sessions, within a week. The control group was only under daily routine care. The study data were collected using the Persian version of Spielberg's anxiety scale and the Pittsburgh Sleep Quality Inventory. Descriptive and inferential statistical tests were used to analyze the data in SPSS version 20.

Results: The results showed a significant difference among the three groups in terms of anxiety score ($P < 0.001$) and in terms of sleep quality after the intervention ($P = 0.027$).

Conclusion: Since the aromatherapy massage as a non-pharmacological and simple method can improve the anxiety and quality of sleep in patients with burns, it is suggested that nurses and burn medical care team apply it to reduce burn patients' anxiety and promote their sleep quality. Applying massage alone also reduces anxiety in burn survivors.

1. Introduction

Patients with burns experience severe pain during dressing and debridement [1] and get anxious before burn treatments [2]. Anxiety, due to mental distress, causes a significant delay in wound healing [3]. Moreover, these patients suffer from sleep disturbances because of wound contractures, apprehensions regarding appearance, financial/employment concerns, fatigue, and pain [4]. Poor quality sleep has a negative effect on the immune system and the process of wound healing that could in turn increase the level of stress [5]. The level of anxiety increases in patients with sleep deprivation and sleep disorders; in other words, arousal dysfunction often leads to persistent sleep-wake difficulties [6].

* *Corresponding author.*
E-mail address: Ameri.farzaneh@gmail.com (F. Ameri).

https://doi.org/10.1016/j.burns.2019.02.017

Although sleep medications and sedatives help improve sleep quality, they have side effects and are addictive, too [5]. Therefore, considering the long process of recovery, the use of complementary medicine are suggested to reduce these complications. Aromatherapy, as one of the complementary medicines, refers to the use of herbal extracts derived from flowers, leaves, stems, fruits, seeds, and roots of plants [7]. The herbal extract is one hundred times more efficient than the herb itself [8]. Two of the most popular ways of aromatherapy are inhalation aromatherapy and massage aromatherapy [9]. One of the essential oils with a sedative effect which is used extensively is the lavender oil extract; the most effective and sedating ingredients found in this herbal compound are linalool and linalyl acetate [10].

Among the other aromatic oils is chamomile oil. German chamomile due to its chamazulene ingredient has a strong anti-inflammatory and analgesic effect. Chamomile strengthens the immune system [11] and can be used during massage [9].

Aromatherapy massage is one of the most popular complementary therapies in nursing which is non-invasive, non-expensive, and simple to use [12]. It includes a variety of methods of manipulation such as rubbing, squeezing, stroking, surface massage, deep massage, and vibrating motions on the body [13]. Good massage promotes intimacy and safety, reduces anxiety, and improves the communication between nurses and their patients [14]. Aromatherapy massage has been widely used in complementary therapies. In aromatherapy massage method, the aromatic herbal oils and herbal volatiles are gradually absorbed through the skin (between 10–30 min) and exert their herbal therapeutic outcomes, such as sedation, analgesia, antispasmodic and antipyretic effects [15]. It has been shown that massage with aromatherapy oils has a more relaxing effect than massage alone [16].

Some studies have shown that aromatherapy alone and aromatherapy with massage are effective on pain, anxiety, mental state, fatigue, and sleep [11,17,18]. Because of the limited studies on the effectiveness of massage with aromatic oils on the anxiety and sleep quality of burn patients, this study aimed to determine the effect of aromatherapy massage using lavender and chamomile oils on the anxiety and sleep quality of patients with the burn.

2. Material and methods

2.1. Study design

It was a quasi-experimental, single-blind study with a control group conducted in 2018. The study aimed to evaluate the effectiveness of aromatherapy massage using lavender and chamomile oil on the anxiety and sleep of Iranian adult burn patients.

2.2. Study participants

The burn patients were selected by convenience sampling method based on the following criteria: age over 18, awareness of time and place, able to speak and understand Persian, their percentage of burns between 10%–45% documented in patients' records [19], with intact areas of skin on leg or back, lack of septicemia symptoms according to patients' records, at least 72 h passed from the burn, absence of physical disability, burns degree of 2 and 3 according to the records, absence of current and past mental disorders, no history of asthma and allergies to plants, lack of history of blood pressure and migraines, absence of self-inflicted burn, and not pregnant.

In case of unwillingness to continue the study, septicemia during the study, removing the skin from the healthy areas of the leg or back during the intervention, sensitivity to the massage oils, and death, the patient was excluded from the study. After a pilot study, we assumed the required sample size of 105 (35 for each group) to determine the changes in anxiety and sleep quality, with 95% confidence level and 80% power, for a dropout rate of 5%. Accordingly, the participants (n=105) were assigned into 3 groups: control group (n=35), placebo group (n=35), and aromatherapy massage group (n=35). Initially, due to the possibility of data contamination arising from the scent of fragrant oils, 16 separate rooms were randomly assigned for the three groups. The patients were assigned to placebo and control groups by random permuted sampling method. The eligible patients in each room were included in the study. Study flow diagram for recruitment and allocation to study groups is shown in Fig. 1.

2.3. Outcome measures

Prior to the intervention, the demographic and clinical information record was completed through a brief interview with eligible patients in each group and also using their medical records. Spielberger's State Anxiety Index (STAI) and the Pittsburgh Sleep Quality Index (PSQI) were used to assess anxiety and sleep quality scores. The questionnaires were used once before the study and once after the end of the third session of the intervention.

STAI was used to assess anxiety. According to this inventory, the subjects' scores are divided to six groups: mild anxiety (20–30), moderate to low anxiety (32–42), moderate to high anxiety (43–53), relatively severe anxiety (54–64), severe anxiety (65–75), and very severe anxiety (>75) [20]. Validity and reliability of STAI have been already confirmed in many studies [21–23]. The internal consistency of the Persian version of STAI has been reported as 0.94 for α in a study by Dehghan Nayeri and Adib-Hajbaghery [24]. To assess sleep quality, PSQI was used. PSQI is a self-report questionnaire. This measure consists of 19 items, covering 7 components that produce one total score. It takes 5–10 m to be completed. The PSQI measures several different aspects of sleep, offering seven component scores and one composite score. The component scores consist of subjective sleep quality, sleep latency (i.e., how long it takes to fall asleep), sleep duration, habitual sleep efficiency (i.e., the percentage of time in bed that one is asleep); sleep disturbances, use of sleeping medication, and daytime dysfunction. Each item is weighted on a 0 to 3 scale. The total PSQI score is then calculated by adding the seven component scores, providing an overall score ranging from 0 to 21, where lower scores denote a healthier sleep quality and a score of 5 or more indicates that a person has a sleep problem. Validity and reliability of PSQI have been confirmed in many studies [25–27]. Farrahi et al. have reported the sensitivity of the Persian version of PSQI as 93% and its internal consistency as 0.89 [28].

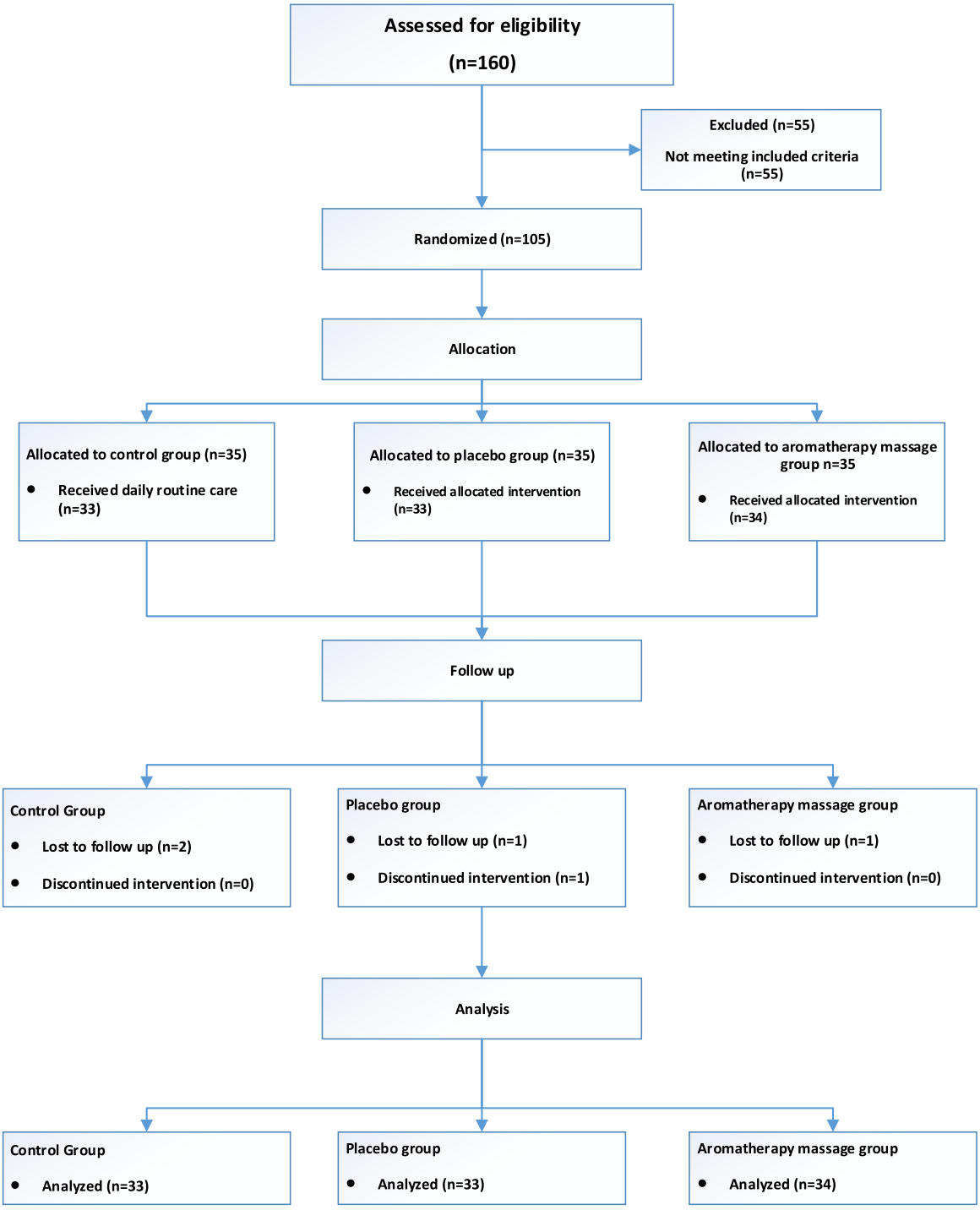

Fig. 1 – Study flow diagram: recruitment and allocation to study groups.

Each paper-and-pencil self-administered questionnaire was completed by the participants with the help of the researcher before and after the intervention.

2.4. *Intervention protocols*

This study was performed on patients admitted to Shahid Motahari Burn and Reconstructive Center affiliated to Iran University of Medical Sciences (IUMS). After obtaining the approval of the Ethics Committee of IUMS and the permission of Shahid Motahari Burns Center, we described the purpose and method of the research to the eligible patients and then took their informed consent.

To assess sensitivity to the oils, the intervention group was tested by rubbing some aromatic oils over the healthy areas of their skin. The next day, before changing the dressing, the site was assessed for signs of allergic reactions such as redness, inflammation, and pruritus and intervention performed in the

absence of an allergic reaction. STAI and PSQI were completed by the participants before the intervention.

2.4.1. *Aromatherapy massage intervention*

The aromatic oil massage group received aromatherapy massage using lavender and chamomile oils for 20 min around 6 to 8 PM (before bedtime) in addition to daily routine care by the researcher (2 drops of pure lavender essence (Lavandula angustifolia) and 2 drops of pure essential oil of chamomile was diluted in 30 mL of grapeseed base oil). The essential oils were obtained from Zardband Drug Pharmaceutical Co. and combined by a traditional medicine specialist (one of the co-researchers). To do the massage, the patients lay down on their bed in prone or side-lying position or a sitting position. The researchers cleaned the intact skin of the massaged areas (legs or back) by a wet towel for better absorption of the oils. After washing hands, they poured 5 mL of oil into their palms and rubbed their palms to warm it and performed massage on the healthy areas of the skin by rubbing the selected oils after obtaining permission from the patient. The selective technique of massage was the effleurage technique. Effleurage movement is a relatively slow and smooth continuous strokes using the flat of the hand. This method improves the absorption of aromatic oils without deep muscle excitement [29]. The researcher and his colleague passed a massage course before the interventions. The participants received the related interventions for three sessions in a week [30].

2.4.2. *Placebo group intervention*

The placebo group received massage using baby oil for 20 min on their intact skin (legs or back) between 6 and 8 PM (before bedtime) in addition to daily routine care and after obtaining their consent. The amount of oil and technique of massage was the same for both groups (aromatherapy massage and placebo group). The sample received the related interventions for three sessions within a week.

Table 1 – Demographic characteristics of the burn patients in the control, placebo, and intervention groups (N=105).

Variables		Control	Placebo	Intervention	P
Age, y, mean±SD		39.59±12.15	37.09±10.97	35.85±10.46	0.395
Sex, no.(%)	Female	11 (34.4)	8 (25)	7 (21.2)	0.469
	Male	21(65.6)	24(75)	26 (78.8)	
Marital status, no.(%)	Single	7 (21.9)	8 (25)	8 (42.2)	0.628
	Married	19 (59.4)	21 (65.6)	23 (69.7)	
	Divorced, Widow	6 (18.8)	3 (9.4)	2 (6.1)	
Employment status, no.(%)	Unemployed (male)	4 (12.5)	4 (12.5)	3 (9.1)	0.804
	Housework (Female)	8 (25.0)	6 (18.8)	6 (18.2)	
	Self-employed	14 (43.9)	12 (37.5)	18 (54.5)	
	Employed	2 (6.2)	5 (15.6)	3 (9.1)	
	Worker	2 (6.2)	2 (6.2)	3 (9.1)	
	Retired	2 (6.2)	3 (9.4)	0 (0.0)	
Educational level, no.(%)	Illiterate	1 (3.11)	2 (3.1)	1 (3.0)	0.800
	Elementary	11 (34.4)	5 (15.6)	6 (18.2)	
	Under diploma	5 (15.6)	6 (18.8)	7 (21.2)	
	Diploma	11 (34.4)	16 (50.0)	13 (39.4)	
	University degree	4 (12.5)	4 (12.5)	6 (18.2)	
Cause of burn, no.(%)	Hot liquids	2 (6.2)	2 (6.2)	2 (6.1)	0.297
	Hot water	8 (25)	6 (18.8)	2 (6.1)	
	Gas explosion	19 (59.5)	17 (53.1)	17 (51.5)	
	Electricity	1 (3.1)	3 (9.4)	1(3.0)	
	Gasoline	1 (3.1)	3 (9.4)	6 (18.2)	
	The explosion of compressed gases	0 (0.0)	0 (0.0)	1 (3.0)	
	Acid	0 (3.0)	0 (0.0)	3 (9.1)	
	Hot object	0 (0.0)	1 (3.1)	1 (3.0)	
%TBSA[a], no.(%)	Oct-15	9 (28.1)	13(40.6)	10(30.3)	0.309
	16-20	9 (28.1)	5 (15.6)	5 (15.2)	
	21-25	6 (18.8)	4 (12.5)	3 (9.1)	
	26-30	0 (0.0)	3 (9.4)	2 (6.1)	
	31-45	8 (25.0)	7 (21.9)	13 (39.4)	
Burn history, no.(%)	Yes	6 (18.8)	3 (9.4)	2 (6.1)	0.266
	No	26 (81.2)	29 (90.6)	31 (93.9)	

[a] Total body surface area.

At the end of the intervention, the questionnaires were completed by all study participants. It is worthy to mention that the control group only received routine care.

2.5. Data analysis

Data analysis was performed by the Chi-square, Fisher exact test, ANOVA, and Paired t test in SPSS-PC v. 20.

3. Results

3.1. Demographic characteristics

In this study, 3 patients (two in the placebo group and one in the experimental group) were excluded from the study because of removing the skin of the healthy areas of their legs or back for skin graft; three patients were also excluded because of discharge from the hospital. The results of the demographic analysis revealed no significant difference between the participants in terms of age, gender, marital status, education, burn history, burn cause, burn percentage, history of addiction, and occupational status (Table 1). The ages of the most patients in the control group (approximately 40%), placebo group (about 43%) and intervention group (about 48%) were between 31 and 40 years and more than 65% of patients were male in all three groups.

Most of the patients in all groups were married. Most subjects in the control group (34.4%) had elementary education or a diploma, and most of the subjects in the placebo group (about 50%) and the intervention group (about 39.4%) had a diploma. More than 70% of the patients in all groups had no history of drug addiction. Most of the samples had no history of previous burns. More than half of the participants expressed that their burn was due to fire. The average percentage of burns in the control, placebo, and experimental groups was 22%, 22%, and 25%, respectively (Table 1).

It is worthy of mention that all patients could receive opioid analgesics and sedatives according to their records. Nevertheless, since most of them had been receiving these drugs, we did not study the medications. However, the assessment of anxiety and sleep quality before the intervention showed no significant difference between the groups.

3.2. Anxiety score

The mean anxiety score before the intervention was about 45 in the control group and 46 in the placebo and control groups. Based on the analysis of variance, the three groups did not have a significant difference regarding the anxiety score (P=0.750). The average anxiety score after the intervention was 47.53 in the control group, 43.06 in the placebo group, and 42.27 in the experimental group. Analysis of variance showed significant differences among the three groups in terms of anxiety score (Table 2) (P<0.001).

3.3. Sleep quality score

Before the intervention, the mean sleep quality scores were 9.44 in the control group, 3.23 in the placebo group, and 9.97 in the control group. The results of ANOVA showed no significant differences among the three groups before the intervention (P=0.740). After the intervention, the mean scores of sleep quality were 10.28 in the control group, 10.03 in the placebo group, and 8.45 in the experimental group; the results of analysis of variance showed that the differences among the three groups was statistically significant after the intervention (P=0.027) (Table 3).

Table 4 presents the comparison of the mean and standard deviation variations of anxiety and sleep quality among the three groups before and after the intervention.

4. Discussion

The purpose of this study was to determine the effect of massage with aromatic oils of lavender and chamomile on anxiety and sleep quality of the patients with burns. The findings showed that the participants suffered from a moderate to high state anxiety and sleep disturbances. These findings are in line with the results of similar investigations [31,32]. The patients with burn experience high levels of anxiety due to painful treatments and their anxiety increases during and after each dressing change. In addition to these painful treatments, they face numerous chronic complications such as burn-related abnormalities and contractures which lead to physical, psychological, and social problems. Moreover, contracture, pain, nightmares and frequent waking throughout the night leads to sleep disorders in these patients [1,4,33]. The level of anxiety in the patients with sleep deprivation increases and patients with sleep disorders suffer from anxiety; in other words, sleep disturbance and anxiety aggravate each other another [34]. Other studies have also revealed a correlation between anxiety and sleep quality [35].

It was found in this study that the use of aromatherapy massage with lavender and chamomile oil and also massage

Table 2 – The anxiety scores of three groups before and after the intervention and comparing the means.

Score of anxiety	Group		
	Aromatherapy massage	Placebo	Control
	Mean±SD	Mean±SD	Mean±SD
Before the intervention	45.33±4.93	46.09±6.17	46.25±4.41
After the intervention	42.27±3.25	43.06±3.50	47.53±6.74
Paired t test results	t=3.749 df=32 P=0.001	t=3.316 df=31 P=0.002	t=1.197 df=31 P=0.240
ANOVA results (After the intervention)	F=11.464	P<0.001	

Table 3 – The sleep quality score in each of the three groups before and after the intervention and comparing the means.

Score of sleep quality	Group		
	Aromatherapy massage	Placebo	Control
	Mean±SD	Mean±SD	Mean±SD
Before the intervention	9.97±4.27	10.12±3.23	9.44±3.44
After the intervention	8.45±3.24	10.03±2.44	10.28±3.01
Paired t test results	t=3.497 df=32 P=0.001	t=0.273 df=31 P=0.786	t=2.520 df=31 P=0.017
ANOVA results (After the intervention)	F=3.755	P<0.027	

Table 4 – Comparison of the mean and standard deviation variations of anxiety and sleep quality scores in the three groups and related statistics (N=105).

Group	Intervention		Placebo		Control		ANOVA
	SD	Mean	SD	Mean	SD	Mean	
Sleep quality	2.49	−1.51	1.94	−0.09	1.88	0.84	F=10.121 P<0.001
Anxiety	4.69	−3.06	5.17	−3.03	6.05	1.28	F=7.071 P=0.001

by itself (using baby oil) was effective in reducing the anxiety of burn survivors. Considering the significant reduction of the mean score of anxiety in the placebo group after the intervention, it can be said that the researchers' attention and their effective communication during massage may have led to anxiety reduction of these patients. Although placebo is not a cure or a drug, it may affect by building trust between the patient and the therapist [36]. Also, Bassampoor believed that attention to patients could be effective in reducing their anxiety [37]. It is believed that massage by itself can reduce anxiety, promote relaxation and provide pain relief [38]. By increasing parasympathetic activity and decreasing the level of cortisol, massage reduces the level of nervous irritability and increases the level of dopamine and serotonin which in turn leads to relaxation and mood improvement [39]. These results were also in line with the findings of previous studies, including a study that assessed the effect of inhalation aromatherapy and massage aromatherapy on anxiety and pain of patients with burns [40]; a study that investigated the effect of massage on the level of pain, itching, and anxiety levels in adolescents with burns [41], and a study that evaluated the effect of three methods of aromatherapy, massage and aromatherapy massage on the state anxiety of the participants in women's fitness competitions [39].

Our findings showed that aromatherapy massage improved sleep quality. The results of some other studies also showed that aromatherapy massage with lavender oil improved sleep quality and reduced the level of anxiety in preoperative colorectal patients [42]. Another study also showed that aromatherapy massage improved the sleep quality of nurses [43]. Likewise, the result of our study were in line with the result of a study by Lee et al. [44]. They showed that hand massage with lavender could improve the quality of sleep in the test group compared to the placebo group [44]. The results of our study were also in line with the results of another study with the aim of examining the effect of massage with and without aromatherapy oil in foot care and it was found that massage with aromatic oils had a more relaxing effect than massage alone [16].

By increasing the parasympathetic activity, massage reduces nervous irritability, heart rate, breathing rate, and blood pressure [45]. On the other hand, by improvement of communication between nurse and patient, massage leads to a sense of security and peace [46]. By aromatherapy massage, the aromatic and volatile herbs are gradually absorbed through the skin in 10–30min and create their therapeutic effects such as sedative, anti-spasmodic and anti-inflammatory effects by affecting the limbic system [15]. Linalool and acetate linalyl can stimulate the parasympathetic system; linalyl acetate has narcotic effects and linalool acts as a sedative [47]. German chamomile also has potent anti-inflammatory effects due to its chamazolin ingredient; chamomile has a boosting effect on the immunity system [47]. Aromatherapy massage is effective on muscle spasm, insomnia, pain, and anxiety, too [40,44]. However, the results showed that the sleep quality of the control group decreased after the study (Table 3).

5. Conclusion

This study showed that using aromatic oils of Lavender and Chamomile during massage and massage alone can help to reduce anxiety. It was also determined that using aromatic oils of Lavender and Chamomile during massage improves sleep quality in patients with burns. Considering the destructive effects of anxiety and sleep disorders on the health of patients with burn, complications of pharmaceutical products, and the key role of nurses in reducing anxiety and improving the sleep quality of these patients, it is suggested that this non-pharmacological and complementary method be used to manage anxiety and sleep disorders of these patients. More research required comparing the effect of these oils with other aromatic oils and also comparing the effect of inhalation of

these oils and using them through skin massage on the anxiety and sleep disorders of burn patients.

Authors' contributions

Forough Rafii: Supervising the initial proposal design, monitoring all stages of the study and reviewing of the draft.

Farzaneh Ameri: Compiling the initial design, writing the article draft, collecting, analyzing, and interpreting the study results.

Hamid Haqqani: Supervising data analysis.

Ali Ghobadi: Supervising the preparation of compound oils.

Financial disclosure

None declared.

Funding/support

This study has been extracted from a dissertation project and financially supported by Iran University of Medical Sciences and registered with the code: IRI N1 IRCT 2018120038444 at the Iranian Center for Clinical Trials.

Conflict of interest

The author have no conflict of interest to declare.

Acknowledgments

The authors would like to appreciate the Iranian University of Medical Sciences, the study patients and the staff of Shahid Motahari Burn and Reconstructive Center.

REFERENCES

[1] Kafi SM, Atashkar SR, Amir Alavi S, Rezvani S. Relationship of post-traumatic stress disorder with psychological defence styles in burn patients. Q Horizon of Med Sci 2013;19:155–60.
[2] Wakim JH, Smith S, Guinn C. The efficacy of music therapy. J Perianesth Nurs 2010;25:226–32.
[3] Upton D, Solowiej K. Pain and stress as contributors to delayed wound healing. Wound Pract Res J Aust Wound Manag Assoc 2010;18:114–22.
[4] Masoodi Z, Ahmad I, Khurram F, Haq A. Changes in sleep architecture after burn injury:'Waking Up'to this unaddressed aspect of postburn rehabilitation in the developing world. Can J Plast Surg 2013;21:234–8.
[5] Kurt S, Enç N. Sleep problems çn critical care patients and nursing care. Turk J Cardiovasc Nurs 2013;4:1–8.
[6] Ramsawh HJ, Stein MB, Belik S-L, Jacobi F, Sareen J. Relationship Of anxiety disorders, sleep quality, and functional impairment in a community sample. J Psychiatr Res 2009;43:926–33.
[7] Dunning T. Aromatherapy overview, safety and quality issues. OA Altern Med 2013;1:6.
[8] Bahraini S, Naji A, Mannani R. Effects of aromatherapy and its aplication. Urima Nurs Midwifery Faculty 2011;9:1–8.
[9] Bharkatiya M, Nema RK, Rathore KS, Panchawat S. Aromatherapy: short overview. Int J Green Pharm (IJGP) 2008;2:12–6.
[10] Setzer WN. Essential oils and anxiolytic aromatherapy. Nat Prod Commun 2009;4:1305–16.
[11] O'Flaherty L-A, van Dijk M, Albertyn R, Millar A, Rode H. Aromatherapy massage seems to enhance relaxation in children with burns: an observational pilot study. Burns 2012;38:840–5.
[12] Toth M, Kahn J, Walton T, Hrbek A, Eisenberg DM, Phillips RS. Therapeutic massage intervention for hospitalized patients with cancer: a pilot study. Altern Complement Ther 2003;9:117–24.
[13] Benjamin P. Understanding spotrs massage Tehran. Bamdad; 2005.
[14] Guterl CC, See EY, Blanquer SB, Pandit A, Ferguson SJ, Benneker LM, et al. Challenges and strategies in the repair of ruptured annulus fibrosus. Eur Cells Mater 2013;25:1–21.
[15] Steflitsch W, Steflitsch M. Clinical aromatherapy. J Men Health 2008;5:74–85.
[16] Eto K, Yamazaki AK, Yonekura K, Mukuda M, Kabasawa Y, Yoshida H, et al. A preliminary examination of effect of massage and aroma oil massage in foot care nursing. Procedia Comput Sci 2015;60:1524–31.
[17] Karadag E, Samancioglu S, Ozden D, Bakir E. Effects of aromatherapy on sleep quality and anxiety of patients. Nurs Crit Care 2017;22:105–12.
[18] Domingos TdS, Braga EM. Massage with aromatherapy: effectiveness on anxiety of users with personality disorders in psychiatric hospitalization. Revista da Escola de Enfermagem da USP 2015;49:450–6.
[19] Ardabili FM, Purhajari S, Ghzeljeh TN, Haghani H. The effect of shiatsu massage on underlying anxiety in burn patients. World J Plast Surg 2015;4:36.
[20] Spilberger C. State–trait anxiety inventory. CA USA: Consulting Psychologists Press; 1983.
[21] Vitasari P, Wahab MNA, Herawan T, Othman A, Sinnadurai SK. Re-test of state trait anxiety inventory (STAI) among engineering students in Malaysia: reliability and validity tests. Procedia-Soc Behav Sci 2011;15:3843–8.
[22] Quek KF, Low WY, Razack AH, Loh CS, Chua CB. Reliability and validity of the spielberger state-trait anxiety inventory (STAI) among urological patients: a Malaysian study. Med J Malays 2004;59:258–67.
[23] Metzger RL. A reliability and validity study of the state-trait anxiety inventory. J Clin Psychol 1976;32:276–8.
[24] Dehghan-nayeri N, Adib-Hajbaghery M. Effects of progressive relaxation on anxiety and quality of life in female students: a non-randomized controlled trial. Complement Ther Med 2011;19:194–200.
[25] Popević MB, Milovanović AP, Milovanović S, Nagorni-Obradović L, Nešić D, Velaga M. Reliability and validity of the pittsburgh sleep quality index-serbian translation. Eval Health Prof 2018;41:67–81.
[26] Marques D, Gomes AA, Meiavia A, Salgueiro A, Ribeiro CC, Dischler J. Reliability and initial validation of the Pittsburgh Sleep Quality Index, European Portuguese version: a preliminary study in a sample of higher education students. Sleep Med 2013;14:139–40.
[27] Backhaus J, Junghanns K, Broocks A, Riemann D, Hohagen F. Test–retest reliability and validity of the Pittsburgh Sleep Quality Index in primary insomnia. J Psychosom Res 2002;53:737–40.
[28] Farrahi J, Nakhaee N, Sheibani V, Garrusi B, Amirkafi A. Psychometric properties of the persian version of the pittsburgh sleep quality index addendum For Ptsd (Psqi-A). Sleep Breath 2009;13:259.

[29] Price L, Price S. Aromatherapy for health professionals E-Book. Elsevier Health Sciences; 2011.
[30] Cinar S, Eser I. Effect on sleep quality of back massage in older adults in rest home. DEUHYO ED 2012;5:2–7.
[31] Fauerbach J, Lawrence J, Haythornthwaite J, Richter L. Coping with the stress of a painful medical procedure. Behav Res Ther 2002;40:1003–15.
[32] Boeve S, Aaron L, Martin-Herz S, Peterson A, Cain V, Heimbach DM, et al. Sleep disturbance after burn injury. J Burn Care Rehabil 2002;23:32–8.
[33] Tan X, Yowler CJ, Super DM, Fratianne RB. The Efficacy of music therapy protocols for decreasing pain, anxiety, and muscle tension levels during burn dressing changes: a prospective randomized crossover trial. J Burn Care Res 2010;31:590–7.
[34] Cho M-Y, Min ES, Hur M-H, Lee MS. Effects of aromatherapy on the anxiety, vital signs, and sleep quality of percutaneous coronary intervention patients in intensive care units. Evid-Based Complement Altern Med 2013;2013:1–8.
[35] Mehboudi A, Modanloo M, Shariati A, Behnampour N, Bardestani G, Basiri H, et al. Relationship between anxiety and sleep quality in patients on hemodialysis in Borazjan City, 2014. J Res Devel Nurs Midwifery 2016;12:56–63.
[36] Atrak MKR, M. Placebo and patient cheating. Ethics in Sci Technol. 2014;9:21–30.
[37] Bassampoor SS. The effect of relaxation techniques on anxiety of patients with myocardial infarction. J Qazvin Univ Med Sci 2005;9:53–8.
[38] Mok E, Woo CP. The effects of slow-stroke back massage on anxiety and shoulder pain in elderly stroke patients. Complement Ther Nurs Midwifery 2004;10:209–16.
[39] Ghasemi B, Arefinia M, Arefi Niya S, Moradi MR. The effect of three methods of aromatherapy, massage and aromatherapy-massage on anxiety of physical fitness girl players of Isfahan. Qu J Sport Biosci Res 2012;2:17–27.
[40] Seyyed-Rasooli A, Salehi F, Mohammadpoorasl A, Goljaryan S, Seyyedi Z, Thomson B. Comparing the effects of aromatherapy massage and inhalation aromatherapy on anxiety and pain in burn patients: a single-blind randomized clinical trial. Burns 2016;42:1774–80.
[41] Parlak Gürol A, Polat S, Nuran Akçay M. Itching, pain, and anxiety levels are reduced with massage therapy in burned adolescents. J Burn Care Res 2010;31:429–32.
[42] Ayik C, Özden D. The effects of preoperative aromatherapy massage on anxiety and sleep quality of colorectal surgery patients: a randomized controlled study. Complement Ther Med 2018;36:93–9.
[43] Chnag S-B, Chu S-H, Kim Y-I, Yun S-H. The effects of aroma inhalation on sleep and fatigue in night shift nurses. Korean J Adult Nurs 2008;20:941–9.
[44] Lee J-E, Lee Y-W, Kim H-S. Effects of aroma hand massage on the stress response and sleep of elderly inpatients. J Korean Acad Fundamentals of Nurs 2011;18:480–7.
[45] Eimani E, Moshtaqeshgh Z, Ali Hosein T, Alavi Majd H, AbedSaeidi J. The effect of foot massage is the physiological indicators of female patients with cva admitted in the Icu. Yazd Shahid Sadoughi Univ Med Sci 2010;17:209–15.
[46] Braun MB, Simonson SJ. Introduction to massage therapy. Lippincott Williams & Wilkins; 2008.
[47] Fayazi S, Babashahi M, Rezaei M. The effect of inhalation aromatherapy on anxiety level of the patients in preoperative period. Iran J Nurs Midwifery Res 2011;16:278.